

SEQUENCE LISTING

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<120> IDENTIFICATION OF CANDIDA ALBICANS ESSENTIAL FUNGAL  
SPECIFIC GENES AND USE THEREOF IN ANTIFUNGAL DRUG  
DISCOVERY

<130> 10182-015

<140>  
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<150> PCT/CA00/00533  
<151> 2000-05-05

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<151> 1999-05-05

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Glu Ala Ser Trp Ser Asn Ile Asp Phe Leu Pro Ser Phe Ile Glu Ala  
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Ile Val Gly Phe Asn Asp Ser Leu Tyr Glu Gln Thr Ile Glu Thr Ile  
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Phe Gly Leu Gly Asp Thr Glu Val Glu Leu Glu Asp Asp Ala Ser Asp  
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Gln Glu Ile Tyr Ser Thr Val Ile Asn Ser Leu Gly Leu Thr Asp Gln  
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Asp Leu Asp Phe Ile Asn Phe Asp Leu Thr Asn Lys Lys His Thr Pro  
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Arg Ile Ala Ala His Tyr Asp His Tyr Ser Asp Val Leu Thr Lys Phe  
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Gly Asp Arg Leu Lys Ser Glu Cys Ala Lys Asp Ser Phe Gly Asn Ala  
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Val Glu Thr Lys Asn Gly Gln Ile Gln Thr Trp Leu Leu Tyr Asn Asp  
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Lys Ile Tyr Cys Ser Ala Asn Asp Leu Phe Ala Leu Arg Thr Asp Leu  
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Ser Ser His Ser Thr Leu Leu Phe Asp Arg Ile Ile Gly Lys Ser Lys  
180 185 190

Asp Ala Pro Leu Val Ile Leu Tyr Gly Ser Pro Thr Glu Glu Leu Thr  
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Lys Asp Phe Leu Lys Ile Leu Tyr Pro Asp Ala Lys Ala Gly Lys Leu  
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Lys Phe Val Trp Arg Tyr Ile Pro Leu Gly Ile Lys Lys Leu Asp Ser  
225 230 235 240

Ile Ser Gly Tyr Gly Val Ser Leu Lys Met Glu Lys Tyr Asp Tyr Ser  
245 250 255

Gly Ala Glu Gly Asn Pro Lys Tyr Asp Leu Ser Arg Asp Phe Thr Arg  
260 265 270

Ile Asn Asp Ser Gln Glu Leu Val Leu Val Asn Glu Lys His Ser Tyr  
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Glu Leu Gly Val Lys Leu Thr Ser Phe Ile Leu Ser Asn Arg Tyr Lys  
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 Ser Thr Lys Tyr Asp Leu Leu Asp Thr Ile Leu Thr Asn Phe Pro Lys  
 305 310 315 320  
 Phe Ile Pro Tyr Ile Ala Arg Leu Pro Lys Leu Leu Asn His Glu Lys  
 325 330 335  
 Val Lys Ser Lys Val Leu Gly Asn Glu Asp Ile Gly Leu Ser Gln Asp  
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 Ser Tyr Gly Ile Tyr Ile Asn Gly Ser Pro Ile Asn Pro Leu Glu Leu  
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 Asp Lys Glu Leu Ile Asn Asn Ser Ile Ala Phe Lys Lys Leu Asp Lys  
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 Lys Ala Ile Gln Ile Arg Ile Asn Thr Gly Asp Thr Asp Val Phe  
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 Gly Lys Leu Lys Thr Lys Phe Lys Leu Thr Ala Leu Thr Asn Gly Gln  
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 Asp Asn Met Asp Trp Phe Asp Leu Val Thr Ser Ile Val Thr Lys Ser  
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 Phe His Val Asp Glu Lys Arg Phe Ile Val Asp Val Asn Arg Phe Asp  
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 Phe Ser Ser Leu Asp Phe Ser Asn Ser Ile Asp Val Thr Thr Tyr Glu  
 885 890 895

Glu Asn Ser Pro Val Asp Val Leu Ile Ile Leu Asn Pro Met Asp Glu  
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 Tyr Ser Gln Lys Leu Ile Ser Leu Val Asn Ser Ile Thr Asp Phe Leu  
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 1395 1400 1405  
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 ataatattta ccagaaatttgc tacaatataa aaataaataaa ataaataaaat ataattaaga 300  
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 Met Ser Ser Leu Arg Lys Asp Phe Tyr Leu Lys Asp Asn Thr Asp Asp  
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Ile Pro Thr Pro Ile Ile Thr Asn Ala Asn Lys Ser Arg Arg Lys Ser			
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caa ttg gaa aat tta cct cca tta att aaa aag aaa aca att ggt cgt		883	
Gln Leu Glu Asn Leu Pro Pro Leu Ile Lys Lys Lys Thr Ile Gly Arg			
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Asn Asn Ser Asn Asn Phe Glu Asn Asp Leu Val Ser Pro Met Thr Lys			
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atg aaa act aat gat agt gaa gat att act aat act agc acc act gct		979	
Met Lys Thr Asn Asp Ser Glu Asp Ile Thr Asn Thr Ser Thr Thr Ala			
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aat cat atg aaa ctt ggt att ggt gct aca acc ctt ggt gtt gga act		1027	
Asn His Met Lys Leu Gly Ile Gly Ala Thr Thr Leu Gly Val Gly Thr			
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ggt act acc gcc act gcc act gct gct gct ggt aga aga cca		1075	
Gly Thr Thr Ala Thr Ala Thr Ala Ala Gly Arg Arg Pro			
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Ser Arg Ser Ser Ile Asp Ser Glu Ala Asp Ser His Ala Ser Arg Ser			
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Ser Gln Glu Thr Glu Glu Asp Val Cys Phe Pro Met Val Gly Asp His			
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Ile Arg Val Asn Gly Ile Asp Phe Asp Glu Ile Asp Glu Phe Ile Arg			
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Ile Leu Arg Ile Asp Glu Phe Gln Asn Leu Ser Lys Asn Asn Thr Thr			
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aaa aat aat ggt ggt gat ggt ggt tct agt atg gca gca tta aaa		1411	
Lys Asn Asn Gly Gly Asp Gly Gly Ser Ser Met Ala Ala Leu Lys			
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tat act cca aaa aat att tta aag aaa aca tta tca aga ttt gaa ttt		1459	
Tyr Thr Pro Lys Asn Ile Leu Lys Lys Thr Leu Ser Arg Phe Glu Phe			
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Thr His Glu Asn Ser Ser Ser Glu Glu Ile Tyr Glu Leu Lys Thr		
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Lys Gln Gln Pro Pro Tyr Lys Tyr Asp Asp Gln Leu Ser Leu Thr Ser		
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Ser Thr Ser Thr Ser Gly Ser Gly Ser Gly Gln Val Lys Phe Gly		
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Gly Ala Arg Ile Ser Asp Gly Ile Asn Gly Gly Ser Leu Pro Asp Arg		
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Phe Ser Leu Phe His Ser Glu Ser Glu Glu Thr Ile His Ala Pro Asp		
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Ile Pro Ser Leu Val Ser Pro Gly Gln Ser Val Arg Asp Leu Phe Arg		
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Asn Gly Glu Glu Thr Trp Trp Leu Asp Cys Thr Cys Pro Thr Asp Ser		
475 480 485		
gaa atg aaa atg ttg gcc aaa gca ttt ggt att cat cct tta act gct		1843
Glu Met Lys Met Leu Ala Lys Ala Phe Gly Ile His Pro Leu Thr Ala		
490 495 500		
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Glu Asp Ile Arg Met Gln Glu Thr Arg Glu Lys Val Glu Leu Phe Lys		
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Ser Tyr Tyr Phe Val Cys Phe His Thr Phe Glu Ala Asp Lys Glu Ser		
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Glu Asp Tyr Leu Glu Pro Ile Asn Val Tyr Ile Val Val Phe His Asp		
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Gly Ile Leu Thr Phe His Phe Ser Pro Ile Ser His Pro Ala Asn Val		
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Arg Arg Arg Val Arg Gln Leu Arg Asp Tyr Val Asp Val Ser Ala Asp		
570 575 580		
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Trp Leu Cys Tyr Ala Leu Ile Asp Glu Ile Thr Asp Gly Phe Ala Pro		
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Val Ile His Gly Ile Glu Tyr Glu Ala Asp Ala Ile Glu Asp Ala Val		
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Phe Thr Ala Arg Asp Thr Asp Phe Ser Ser Met Leu Gln Arg Ile Gly		
615	620	625
630		
gaa tca aga aga aaa gtc atg act tta atg aga tta tta tca ggt aaa		2275
Glu Ser Arg Arg Lys Val Met Thr Leu Met Arg Leu Leu Ser Gly Lys		
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gct gat gtc att aaa atg ttt gct aaa aga tgt caa gaa gaa gct aat		2323
Ala Asp Val Ile Lys Met Phe Ala Lys Arg Cys Gln Glu Ala Asn		
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tct tct tct ggt tat tat caa cgt caa tat aac tta caa caa caa caa		2371
Ser Ser Ser Gly Tyr Tyr Gln Arg Gln Tyr Asn Leu Gln Gln Gln		
665	670	675
caa cag gcc cca cca cca cca cct aat cct att att act tca cca att		2419
Gln Gln Ala Pro Pro Pro Pro Asn Pro Ile Ile Thr Ser Pro Ile		
680	685	690
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Asn Ser Thr Leu Asn Leu Ser Leu Gly Thr Ser Thr Gly Gly Gly		
695	700	705
710		
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Val Gly Val Gly Ile Asn Phe Gly Pro Asn Pro Thr Gly Asn Asn		
715	720	725
act aat act aat act aat act aat ggt tca cct tca cca cct caa caa		2563
Thr Asn Thr Asn Thr Asn Thr Gly Ser Pro Ser Pro Pro Gln Gln		
730	735	740
caa caa caa cat ggt atc act aac aaa tct ttc ccc atc ccc gat gca		2611
Gln Gln Gln His Gly Ile Thr Asn Lys Ser Phe Pro Ile Pro Asp Ala		
745	750	755
cgt cca aga gct gat att gca tta tat tta ggt gat att caa gat cat		2659
Arg Pro Arg Ala Asp Ile Ala Leu Tyr Leu Gly Asp Ile Gln Asp His		
760	765	770
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Ile Ile Thr Met Phe Gln Asn Leu Leu Ala Tyr Glu Lys Ile Phe Ser		
775	780	785
790		
cgt tca cat tca aat tat tta gct caa tta caa gtt gaa tca ttc aat		2755
Arg Ser His Ser Asn Tyr Leu Ala Gln Leu Gln Val Glu Ser Phe Asn		
795	800	805
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Ser Asn Asn Lys Ile Thr Glu Met Phe Ser Lys Ile Thr Leu Ile Gly		
810	815	820

aca atg tta gtt cca tta aat tta gtc acg gga ctt ttt ggt atg aat	2851		
Thr Met Leu Val Pro Leu Asn Leu Val Thr Gly Leu Phe Gly Met Asn			
825	830	835	
gta aga gtc cct ggt gaa ggt ggt acc aat tta ggt tgg ttt ttc gga	2899		
Val Arg Val Pro Gly Glu Gly Thr Asn Leu Gly Trp Phe Phe Gly			
840	845	850	
att gtt gga gta tta ata ttt ata att att gga tca ttt ata ttt gct	2947		
Ile Val Gly Val Leu Ile Phe Ile Ile Gly Ser Phe Ile Phe Ala			
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caa tgg tgg ttg aaa aaa ttg aat aat tca att gaa gga caa aat aat	2995		
Gln Trp Trp Leu Lys Leu Asn Asn Ser Ile Glu Gly Gln Asn Asn			
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ggt aat cga cca att ttt aat cat tca tca aga aga tca att aga agt	3043		
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890	895	900	
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Leu Gly Leu Lys His Gly Gly Asn Lys Ser Ile Ile Ser Phe Pro			
905	910	915	
aat aaa tat gaa taagaataat caaagaaatg ccacagagtt tgatggtttg	3143		
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Lys	Asn	Arg	Asn	Tyr	Asn	Met	Ser	Ser	Leu	Arg	Lys	Asp	Phe	Tyr	Leu
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Lys	Asp	Asn	Thr	Asp	Asp	Asn	Ser	Thr	Asn	Asn	His	Thr	His	Leu	Ala
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145					150				155				160		
Lys	Ser	Arg	Arg	Lys	Ser	Gln	Leu	Glu	Asn	Leu	Pro	Pro	Leu	Ile	Lys
				165				170				175			
Lys	Lys	Thr	Ile	Gly	Arg	Asn	Asn	Ser	Asn	Asn	Phe	Glu	Asn	Asp	Leu
				180				185				190			
Val	Ser	Pro	Met	Thr	Lys	Met	Lys	Thr	Asn	Asp	Ser	Glu	Asp	Ile	Thr
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Thr	Leu	Gly	Val	Gly	Thr	Gly	Thr	Thr	Ala	Thr	Ala	Thr	Ala		
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Ser	His	Ala	Ser	Arg	Ser	Ser	Gln	Glu	Thr	Glu	Glu	Asp	Val	Cys	Phe
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Gln	Met	Ile	Ala	Lys	Asn	Ile	Leu	Arg	Ile	Asp	Glu	Phe	Gln	Asn	Leu
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His	Ser	Asn	Asn	Asn	Lys	Lys	Asn	Asn	Gly	Gly	Asp	Gly	Gly	Ser	
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 Gly Gln Val Lys Phe Gly Gly Ala Arg Ile Ser Asp Gly Ile Asn Gly  
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catcattgga gaaaatacca tgctaattgat gatcctgatg tcaaaataaa acataaagaa 360
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His Leu Trp Lys Leu Phe Gln Gln Gly Ala Pro Phe Cys Val Leu Ile			
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Asn His Ile Leu Pro Asp Ser Gln Ile Pro Val Val Ser Ser Asp Asp			
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Thr Gln Leu Asn Phe Asp Asp Glu Asn Met Phe Thr Ile Ser Asn Val			
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Phe Ser Asp Asn Ala Gln Asp Leu Ile Lys Ile Ile Asp Val Ile Asn			
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Lys Leu Leu Ala Glu Tyr Ser Asp Ala Ser Asp Leu Gly Gly Asp			
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Glu Asp Val Asn Met Asp Val Gln Ile Thr Asp Glu Arg Ser Lys Val			
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ttc cga gaa att atc gaa aca gaa aga aaa tat gtt caa gac ttg gaa		2897	
Phe Arg Glu Ile Ile Glu Thr Glu Arg Lys Tyr Val Gln Asp Leu Glu			
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cta atg tgt aaa tac cgt caa gat cta att gaa gcc gaa aat ttg tct		2945	
Leu Met Cys Lys Tyr Arg Gln Asp Leu Ile Glu Ala Glu Asn Leu Ser			
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Ser Glu Gln Ile His Leu Leu Phe Pro Asn Leu Asn Glu Ile Ile Asp			
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att aga tat caa aga att gga tca gta ttt att cat gct tct ttg ggc		3089	
Ile Arg Tyr Gln Arg Ile Gly Ser Val Phe Ile His Ala Ser Leu Gly			
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cct ttc aat gct tat gaa cct tgg act ata gga caa ttg acg gcg att		3137	
Pro Phe Asn Ala Tyr Glu Pro Trp Thr Ile Gly Gln Leu Thr Ala Ile			
365	370	375	

gat ttg atc aac aaa gaa gct gct aat ttg aaa aaa tca tcg agt cta		3185	
Asp Leu Ile Asn Lys Glu Ala Ala Asn Leu Lys Ser Ser Ser Leu			
380	385	390	
ctt gat cct ggg ttt gaa ctt caa tcg tat ata tta aag ccg atc caa		3233	
Leu Asp Pro Gly Phe Glu Leu Gln Ser Tyr Ile Leu Lys Pro Ile Gln			
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aga ttg tgt aaa tac cca ctt ttg ttg aaa gag tta atc aaa aca tca		3281	
Arg Leu Cys Lys Tyr Pro Leu Leu Lys Glu Leu Ile Lys Thr Ser			
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cca gaa tat tca aaa cag gac ccc cat ggc agc tcg tca ttg aca tca		3329	
Pro Glu Tyr Ser Lys Gln Asp Pro His Gly Ser Ser Ser Leu Thr Ser			
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Phe Asn Glu Leu Leu Val Ala Lys Thr Ala Met Lys Glu Leu Ala Asn			
445	450	455	
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Lys Leu Lys Glu Arg Val Gly Asn Trp Arg Gly Phe Asn Leu Asp Ala			
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Phe Thr Glu Ile Asp Asp Asn Lys Lys Ser Asp Lys Gln Glu Lys Lys			
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Ser Lys Phe Ser Thr Arg Lys Arg Ser Thr Ser Ser Asn Leu Ser Ser			
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tcg act act aat ttg ttg gaa tca ata aac aat tcc cga aag gat aac		3713	
Ser Thr Thr Asn Leu Leu Glu Ser Ile Asn Asn Ser Arg Lys Asp Asn			
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aca ttg cca ttg gaa tta aaa gga aga gtt tat ata tcg gag att tat		3761	
Thr Leu Pro Leu Glu Leu Lys Gly Arg Val Tyr Ile Ser Glu Ile Tyr			
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Asn Ile Ser Ala Pro Asn Thr Pro Gly Ser Thr Leu Ile Ile Ser Trp			
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Glu Met Asn Lys Gln Ile His Lys Lys Leu Arg Asp Ser Asp Leu Ser			
635	640	645	
ttt aat act gat gac tct gcc ata tat gat tac acg ggt att agt acg		4001	
Phe Asn Thr Asp Asp Ser Ala Ile Tyr Asp Tyr Thr Gly Ile Ser Thr			
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Ser Pro Val Asn Gln Ser Thr Gln Gln Gln Tyr Tyr Asp His Arg Gly			
670	675	680	
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Ser His Ser Ser Arg His His Ser Ser Ser Thr Leu Ser Met Met			
685	690	695	
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Lys Asn Asn Arg Val Lys Ser Gly Asp Leu Ser Arg Ile Ser Ser Thr			
700	705	710	
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Ser Thr Thr Leu Asp Ser Phe Ser Asn Asn Leu Asn Gly Ser Pro Asn			
715	720	725	
acc act aat cca tct ttg acg tct tca gat gcc acc aaa aca att cca		4241	
Thr Thr Asn Pro Ser Leu Thr Ser Ser Asp Ala Thr Lys Thr Ile Pro			
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Thr Phe Asp Val Ala Ile Lys Leu Leu Tyr Lys Ser Thr Glu Leu Ser			
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Glu Pro Leu Ile Val Asn Ala Gln Ile Glu Tyr Asn Asp Leu Leu Gln			
765	770	775	
aaa att atc tcc cag att atc act tcg aac ttg gtg gct gat gat gtc		4385	
Lys Ile Ile Ser Gln Ile Ile Thr Ser Asn Leu Val Ala Asp Asp Val			
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810	815	820	825

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Glu Asp Phe Tyr Gln Thr Ser Ser Asn Glu Lys Arg Leu Val Thr Val  
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 Ser Val Phe Ile His Ala Ser Leu Gly Pro Phe Asn Ala Tyr Glu Pro  
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 Trp Thr Ile Gly Gln Leu Thr Ala Ile Asp Leu Ile Asn Lys Glu Ala  
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Gln Ser Tyr Ile Leu Lys Pro Ile Gln Arg Leu Cys Lys Tyr Pro Leu  
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 Pro His Gly Ser Ser Ser Leu Thr Ser Phe Asn Glu Leu Leu Val Ala  
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Gly Asp Leu Ser Arg Ile Ser Ser Thr Ser Thr Thr Leu Asp Ser Phe  
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Leu Leu Tyr Lys Ser Thr Glu Leu Ser Glu Pro Leu Ile Val Asn Ala  
755 760 765

Gln Ile Glu Tyr Asn Asp Leu Leu Gln Lys Ile Ile Ser Gln Ile Ile  
770 775 780

Thr Ser Asn Leu Val Ala Asp Asp Val Asn Ile Ser Arg Leu Arg Tyr  
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Lys Asp Asp Glu Gly Asp Phe Val Asn Leu Asn Ser Asp Asp Asp Trp  
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Gly Leu Val Leu Asp Met Leu Thr Ser Glu Asp Phe Tyr Gln Thr Ser  
820 825 830

Ser Asn Glu Lys Arg Leu Val Thr Val Trp Val Ser  
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